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ABSTRACT

Since questions are used in a wide variety of ways to test comprehension, clarify communication, and determine levels of proficiency, it is important to be aware of the factors that influence how an individual answers a question. The influence on comprehension of vocabulary, syntax, and material organization has been studied and this influence diminishes with the developing maturity of the answerer. The individual's knowledge base is the most important influence on comprehension and the ability to answer questions. A second important influence on how information is learned and how questions are answered is the situational context in which the information was found and the inclusion of some of the original text in the question. The context includes instructions for reading, task structure, perceived authority, and context shifts. (TJ)

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EVALUATING COMPREHENSION QUESTIONS: WHY SOME QUESTIONS

MAY BE QUESTIONABLE*

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Written comprehension questions are used extensively in education. Questions are used at an informal level as a means to clarify communication. At a more formal level, teachers use questions as a means to develop comprehension skills and to determine what students have learned. Test makers use carefully constructed questions to determine levels of proficiency and how individuals differ with regard to what is measured. Researchers use questions to determine what people learn, how information is put into memory, how information is stored in memory, how information is retrieved from memory, and even the form of memory itself.

Since questions are used so widely, it is important that a question user be aware of the factors that influence how an individual answers a question. Awareness of these factors should lead to better question construction and test interpretation. Ignoring these factors can lead to questions which confuse and/or mislead the test taker and consequently produce uninterpretable or misinterpreted answers.

In order to formulate appropriate questions and to interpret correctly the answers which result, the question user must be aware that answers are directly affected by (1) the situational context in which information

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originally appears and in which the question is asked and (2) the general knowledge of an individual which relates to the information under consideration. These two variables, more than any others, can effect an individual's ability to answer any question by overriding the influence of vocabulary and syntax, variables often suggested as the major factors influencing comprehension. It is necessary to emphasize that vocabulary and syntax are important to comprehension but that they become less important as the reader matures. In this paper a schema is proposed which suggests the relative importance for mature readers of variables which influence comprehension and consequently the ability to answer questions.

Vocabulary, Syntax, and Material Organization

The influence on comprehension of vocabulary and syntax has been debated. Research has shown that the vocabulary of a passage as well as the syntactic forms of a passage influence how easily the passage is read and comprehended (Bormuth, 1966). This finding, however, must be qualified. As the reader matures, vocabulary and syntax seem to have less influence on comprehension. Once a reader acquires an adequate sight vocabulary, good decoding skills, and familiarity with syntactic forms, vocabulary and syntax no longer stand in the way of comprehension. For most readers in the upper grades, simplifying vocabulary in order to make a passage more understandable may actually reduce comprehension (McCracken, 1959). Similarly controlling syntax may make a passage more difficult (Pearson, 1974-75). Consequently, it appears that manipulation of syntax and control of vocabulary may not improve comprehension for mature readers.

What seems to be more important than vocabulary and syntax is how explicitly a writer sets forth his ideas (Marshall and Glock, 1975), and how well his ideas are organized. Frase (1972), Meyer (1975), Marshall and Glock (1978) have demonstrated how the structure of discourse influences the processing activities a student uses to comprehend that discourse. Well organized and explicit text produces better comprehension than text in which sentences present ideas in a less organized and less explicit fashion. Well organized and explicit text makes it possible for people to use higher-order processes of comprehension and thus derive a better understanding of the relation of ideas within a text.

In a similar vein is work by Ausubel who investigated the role that advanced organizers (superordinate statements) would play in comprehension. He postulated that facts would be most easily remembered if subsumed under an idea that provided an anchorage for these facts and tied them to a learner's previous knowledge (Ausubel, 1960). Demonstrating Ausubel's postulation, Rickards (1975-76) interspersed superordinate statements in a passage at two paragraph intervals. He found advanced organizers produced greater recall of information both of concepts and related facts. The results of the experiment were interpreted as confirming the presence of a subsumptive process in which details related to a concept are learned and reported in clustered fashion. Rickards postulated that the advanced organizer may reorder existing knowledge structures in a more efficient pattern for anchoring subsumed ideas, thereby enabling a reader to use his existing knowledge structures more effectively.

Even though the way information is organized and presented can effect how well people comprehend what they read, it appears that organization and

explicitness may not be as crucial as (1) the situational context in which information originally appears and in which a question is asked and (2) a person's general knowledge relating to the information under consideration. Paralleling the way in which explicit writing seems to override the importance of vocabulary and syntax is the way the situational context of a passage or question and its relation to an individual's knowledge override the need to be explicit.

The Situational Context

Understanding of language must occur within a situational context. This context influences both a person's approach to comprehension and the other processes that are a part of comprehension (Carroll, 1972). "The special arrangements that are frequently necessary to test comprehension constitute such situational contexts" (Carroll, p. 9).

Tulving and Thompson's (1973) theory of encoding specificity helps to explain why the situational context in which a question is asked is important. They believed that the encoding and retrieval mechanisms work closely together to affect how information is stored in memory and recalled (retrieved from memory). Their conclusion was that the manner in which information is encoded determines how it is stored and that the manner of storing information determines the most effective cues for retrieving it from memory. Their theory is important for explaining why the context of a passage or question influences all question answering activity.

For example, when a question is asked, it is obvious that someone is asking for information to be recalled. What is not so obvious is that a means for recalling or retrieving this information from memory is also suggested. The form the question takes serves as a cue or reminder to

person who is to respond. The form of the question reminds the respondent how the information was originally placed into memory (encoded) and how it might be located and retrieved. As an illustration, one might recall asking a group a question to which the response is blank stares. One is reasonably sure that the printed material to which the question refers has been learned by at least some of the respondents and yet no answers are forthcoming. Then, when the question is rephrased with exact words and/or phrases used in presenting the material, or when the information preceding that desired is described, the respondents suddenly remember the information that will answer the question.

Examples of the theory of encoding specificity abound in research. Frederiksen (1975) concluded that instructions (directions to perform certain operations on information received from text) significantly affect the way a person incorporates information into memory and thus how the text will be understood. In scoring response protocols from one of his experiments, he found the difference produced by instructions was not so much in amount of information stored but in how it was stored. He reasoned that instructions had an enduring and probably permanent effect on how people remember what they have read. Frase (1972) also concluded that verbal directions (which may consist of exhortations, problems, or objectives) determine which related ideas in a passage are learned and how other related ideas are inferred so that any information not seen as belonging to a particular relationship is discarded. For this reason, verbal directions given with little consideration for their effects may misdirect a person. The resulting confusion may explain why some apparently easy questions are answered incorrectly.

Task structure effects are a class of variables that are a part of the situational context which influence how questions are perceived and answered. McConkie (1977) suggested that these task structure effects may have confounded the experimental results of the research on learning from texts. In the same way that the task structure can confound research, it may affect the answers given to questions. For example, the ambiguity of a task or in the context of this paper, a question, may cause different persons to use different strategies to answer the questions. Also, the development of strategies to answer a question may take more time than a question asker is willing to allow. And a person may have, as a result of previous experiences in situations in which questions are asked, expectations about the type of information that will be considered important to the question asker. Failure to consider each aspect of the task structure can lead to questions which are inappropriate or misleading.

Baldwin and Readence (1979) have suggested another aspect of the situational context that can influence the answers given to questions. In a very clever study, a satirical article in a reputable journal was presented to college students who regarded it as a serious contribution to knowledge of reading instruction. The authors explained this inability to read critically as a result of the atmosphere of legitimacy surrounding the article. This atmosphere was a consequence of the article appearing in a reputable journal and presented by an authority figure for consideration without a clue to the nature of the article. This study emphasizes the importance of the situational context in which a task or question is presented. General expectations created by the atmosphere from which a question emerges can short circuit the abilities of people to answer questions appropriately.

A further aspect of the situational context which can cause questions to be uninterpretable or misleading is suggested by Durkin (1979). In her study of comprehension instruction, she found that teachers often switched topics rapidly and with no regard for continuity. When such rapid shifts do occur, then one can assume that contexts in which questions are asked also may be shifted rapidly. It is easy to see that this rapid shifting could easily confuse someone who must answer a question but is not sure of the context in which it is asked.

These studies lend support to Tulving and Thompson's idea that encoding and retrieval mechanisms work closely together influencing how information is stored and how it is retrieved from memory. They also emphasize the importance of the situational context established by task instructions, the task structure, perceived authority, and context shifts to encoding and retrieval of information. Therefore, if the situational context in which the question is asked does not suggest the situational context in which information was originally presented it, is possible the question will be difficult to interpret and consequently difficult to answer. In order to help avoid confusion it seems that when an individual is asked to answer a question, the context in which the needed information was originally presented might be provided as a part of the question itself.

General Knowledge

As a question asker considers the context of a question, s/he must also consider the relationship of the question to the knowledge which the individual brings to the passage, since the meaning people get from discourse is determined by their personal knowledge of the world. To

illustrate that understanding depends on prior knowledge, Anderson, et al. (1976) used three sentences.

The baby kicked the ball.

The punter kicked the ball.

The golfer kicked the ball. (p. 368)

Understanding these sentences is the result of our knowing that a baby kicks a ball hesitantly without the gross motor control and strength which a punter uses to cause a football to explode into the air and travel a long distance. Comprehension of the third sentence involves knowing that a golfer should not kick a ball and probably does so with a surreptitious nudge. If, however, we analyze the situation to be one which has angered the golfer, then we infer the kick to be an angry savage swing of the foot.

As the example demonstrates, understanding of discourse is influenced by how a reader imposes his general knowledge of the world on the situational context. As a result, inferences are made which generate understanding of the sentences in a passage. Consequently, "more important than structures which are in some sense 'in' a text are the knowledge structures the reader brings to the text, "(Anderson et al., 1976, p. 369). These knowledge structures, or "Schemata," may be abstract frameworks representing the interrelated concepts in a particular area of knowledge. When the reader infers that new information fits an available knowledge structure, the message is comprehended.

A study by Pichert and Anderson (1976) indicated how the knowledge structures people may bring to a passage will influence what they consider to be the important ideas of the passage. Two groups were instructed to read the same passage concerning a home tour given a friend by a boy whose

parents are away. One group was to read the passage as though they were burglars and the other group as though they were home buyers. Test results indicated that the ideas remembered did depend on the perspective of the reader, although some ideas were important to both groups. The authors' conclusion was that what may be the main idea for one reader may not be the main idea for another.

Mandler and Johnson (1977) suggested that a story schema, "a set of expectations about the internal structure of stories, . . . serves to facilitate both encoding and retrieval" (p. 112). They believed that the reader starts with an ideal schema which reflects his past experience with stories of many types and/or genres. The longer the time that has passed between encoding a story's schema and recall of the story, the more the original schema is modified to conform to the ideal schema(s) based on past experience.

Probably the most neglected aspect of general knowledge is the background experience necessary for making judgements. Background of experience is more than an amorphous collection of general facts and experiences in various situations. It is essentially the organization of these facts and experiences into a collective whole which can be used. This whole serves as a set of standards against which one measures any new incoming data. The act of comparing and contrasting the new with the old, the known with the unknown, is the only means by which an individual learns (Dinnan, 1976). One can only know white if he knows black; happiness if he knows sorrow; pain if he knows absence of pain; relevant details if he knows irrelevant details; logical conclusions if he knows illogical conclusions. For this reason experience with the processes of comparing and contrasting may constitute the most important aspect of general knowledge.

To make judgements a person must already have established criteria which serve as standards against which to make judgements. For example, if a student is to make a decision concerning whether a piece of discourse is fact or opinion, the student must have established some criteria for measuring fact and opinion. He must have some preconceived standard of what constitutes fact and opinion against which to judge the degree of factness or opinionness which the new material possesses.

Even the skill of drawing conclusions, a skill which all believe to be important, requires one to know what constitutes an acceptable conclusion in the particular context in which one is asked to draw the conclusion. It is only through previous experiences where one has been exposed to acceptable conclusions and has been shown how acceptable conclusions differ from unacceptable ones does one develop the criteria for making the judgement of acceptable or unacceptable.

Herber (1978) discussed the importance of preestablished criteria for making judgements about what one reads. He indicated that good readers are able to answer questions which call for relevant facts or main ideas because they know what distinguishes relevant from irrelevant facts or distinguishes a main idea from an idea that is not general enough to encompass all details. Herber's suggestions for instruction are made with the idea that criteria for judgements must first be established through simulation or modeling before a student can be expected to handle questions independently. Henry (1974) has advocated teaching concepts by emphasizing the basic process of comparing and contrasting exemplars with non-exemplars of the concept under consideration.

Background of experience is commonly acknowledged as fundamental to comprehension and ability to answer questions. However, the phrase, provide

the necessary background of experience, is too general to be completely helpful to the teacher. A teacher needs to know what specifically is the necessary background of experience. At least a partial answer includes the role of specific criteria for judging the adequacy of answers to questions. Only through repeated exposures to examples of correct and incorrect answers and the explanation (both teacher and student explanations) of why an answer is correct or incorrect will a student begin to build the criteria which allow him to distinguish acceptable from unacceptable answers.

As these studies demonstrate, the general knowledge which an individual brings to a particular situation determines to a large degree how well the individual interprets situations, makes inferences necessary for understanding, and remembers what was learned. It should be obvious that the more a person knows about a particular area of information, the more easily that person can answer questions about that area of information. What might not be as obvious is that the more a person knows the less likely other variables (such as explicitness of ideas, syntax, vocabulary, and to a degree even the situational context) are to interfere with understanding. With regard to the situational context, the more a person knows, the more likely he will be to supply the appropriate situational context when the context is ambiguous.

The reason for dealing with background knowledge at such length is that even though its importance to comprehension and subsequently to answering questions is generally acknowledged, question users generally ignore its effect on individuals ability to answer questions. When people share similar backgrounds with respect to perspective, general information, and experiences

with the processes of knowing, then questions are not likely to be misinterpreted or confusing. However, the less two people have in common with respect to these variables, the more the question asker must exercise care in formulating questions. Classroom observations and everyday experience suggest that questions are carelessly constructed. Careful construction, of course, does not guarantee perfect communication but disregard of careful construction can insure confusion. And, unfortunately, confused answers are often uninterpretable or misinterpreted as meaningful indicators of learning.

Summary

Questions about passages can be questionable. Answers to questions do not always indicate whether people have comprehended what they have read. In order to evaluate questions and answers to questions, the question user must be aware that research suggests:

1. the individual's knowledge base, in particular his criteria for making judgements, is the most important influence on comprehension and the ability to answer questions, the major indicator of comprehension.
2. instructions for reading, task structure, perceived authority, and context shifts exert influence on how information is learned and how questions about the information are answered. If a question suggests the situational context in which information was found and/or if it contains some of the context in which the information was found in the original text, the likelihood of a question being answered correctly is increased.

3. the manner in which material is organized is not as important to adequate comprehension as a reader's knowledge base and familiarity with the situational context.

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